

## MMT310 Series Moisture and Temperature Transmitter for Oil



Two probe options: MMT317 and MMT318

### Features/Benefits

- Continuous measurement of moisture in oil
- Proven Vaisala HUMICAP® Sensor, 15 years in oil applications
- Measurements in lubrication, hydraulic and transformer oils
- Excellent pressure and temperature tolerance
- Measuring water activity - ppm calculation for transformer oil
- Small size, easy to integrate
- NIST traceable calibration
- Applications: e.g. monitoring of transformer oil and of lubrication systems in marine and paper industry

The Vaisala HUMICAP® Moisture and Temperature Transmitter Series for Oil MMT310 is a fast and reliable on-line detector for moisture in oil.

### Reliable Vaisala HUMICAP® Technology

The MMT310 series incorporates the latest generation of the Vaisala HUMICAP® Sensor, developed for demanding moisture measurement in liquid hydrocarbons. The sensor's excellent chemical tolerance provides accurate and reliable measurement over the wide measurement range.

### Measuring Water Activity

The MMT310 series measures moisture in oil in terms of the water activity (aw) and temperature (T). Water activity directly indicates if there is a risk of free water formation. The measurement is independent of oil type, age, and temperature.

### Water Content as PPM Calculation for Transformer Oils

PPM units are traditionally used in transformer applications. They indicate the average mass concentration of water in oil. The ppm calculation for mineral oil based transformer oil is optional in the MMT310 series.

### Diverse Applications and Demanding Conditions

The MMT310 series can be used in lubrication and hydraulic systems as well as in transformers. It can be used for on-line moisture monitoring and as a control function, allowing separators and oil purifiers to be started only when necessary.

### Installation Options

The MMT318 has two adjustable probe lengths. The transmitter can be ordered with a ball valve set that enables the insertion and removal of the moisture probe for calibration, without the need to empty the oil system.

The MMT317 has a small pressure-tight probe with optional Swagelok fittings.

### Several Outputs, One Connector

The MMT310 series has two analog outputs and an RS-232 serial output. The output signals and the supply power travel in the same cable, the only cable connected to the unit.

# Technical Data

## Measured Values

### WATER ACTIVITY

Measurement range $a_w$	0 ... 1
Accuracy (including non-linearity, hysteresis and repeatability)	
0 ... 0.9	±0.02
0.9 ... 1.0	±0.03
Response time (90 %) at +20 °C in still oil (with stainless steel filter)	10 min

Sensor Vaisala HUMICAP®

### TEMPERATURE

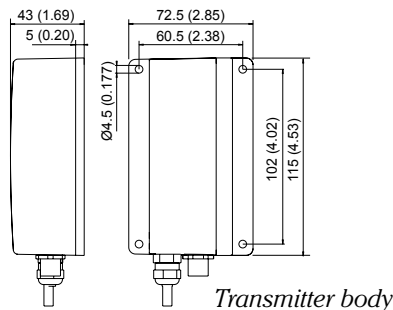
Measurement range	-40 ... +180 °C (-40 ... +356 °F)
Typical accuracy at +20 °C	±0.1 °C (±0.18 °F)
Typical temperature dependence of electronics	±0.05 °C/°C (±0.005 °F/°F)
Sensor	Pt100 RTD Class F0.1 IEC 60751

## Electrical Connections

Two analog outputs, selectable and scalable	0 ... 20 mA or 4 ... 20 mA
Typical accuracy of analog output at +20 °C	±0.05 % full scale
Typical temperature dependence of analog output	0.005 %/°C (0.003 %/°F) full scale
Serial output	RS-232C
Connections	8-pole connector with RS-232C, current outputs (two channels) and $U_{in}$
Operating voltage $U_{in}$	24 VDC (10 ... 35 VDC)
Minimum operating voltage $U_{in}$ with RS-232C	10 VDC
$I_{out}$ 0 ... 20 mA, 4 ... 20 mA	11 VDC + ( $R_{load}/60$ ) VDC
Power consumption at +20 °C, $U_{in}$ = 24 VDC with RS-232C	20 mA
$I_{out}$ 2 x 0 ... 20 mA	60 mA

## Dimensions

Dimensions in mm (inches)

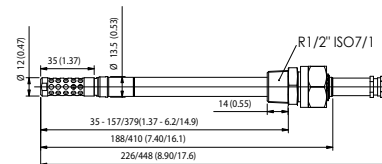
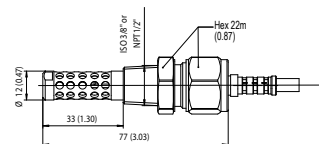


## General

Operating temperature range for electronics	-40 ... +60 °C (-40 ... +140 °F)
Storage temperature	-55 ... +80 °C (-67 ... +176 °F)
Pressure range for MMT318 with ball valve up to 120 °C	0 ... 40 bar
Pressure range for MMT317	0 ... 10 bar
External load	$R_L < 500$ Ohm
Material	
transmitter housing	G-AlSi 10 Mg
transmitter base	ABS/PC
Housing classification	IP65
	to be protected from direct rain
Cable feed through alternatives	8-pole connector with 5 m cable, female 8-pin connector screw joint for cable diameter 4 ... 8 mm
Sensor protection	stainless steel grid standard filter stainless steel grid filter for high flow rates (>1 m/s)
Probe cable length	
MMT317	0.5, 2, 5 or 10 meters
MMT318	2, 5 or 10 meters
Probe installation MMT317	
Swagelok®	NPT 1/2", ISO 3/8" or ISO 1/2"
Probe installation MMT318	
Fitting bodies	ISO 1/2", NPT 1/2"
Ball Valve Set	BALLVALVE-1
Complies with EMC standard EN61326-1, Industrial environment	

Note: When using the current output, the RF field susceptibility level according to standard EN61000-4-3 with a frequency band of 110 ... 165 MHz, is only 3 V/m (generic environment) with the specified accuracy.

HUMICAP® is a registered trademark of Vaisala.



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